

Communicable Diseases Protocol

Invasive Group A streptococcus

Public health priority: Not a notifiable disease.

Clinicians are encouraged to inform the Public Health Unit if two or more related cases occur. The Public Health Unit may also be asked to assist in settings such as health care, child care centres or aged care facilities.

Case management: Treatment of individual cases is the responsibility of the treating doctor.

Contact management: If epidemiological investigations indicate a common exposure in two or more hospital-acquired cases, evaluation of carriage among contacts (including HCWs) is required.

Close contacts should be given information about the signs and symptoms of group A streptococcal disease.

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1. The disease

Infectious agent

Group A streptococcus (GAS) - a gram positive β -haemolytic coccus.

Surface M protein (emm gene) confers resistance to phagocytosis and is a major determinant of virulence and the ability to cause invasive disease. There are currently more than 180 emm types described globally. Serotypes M1, M3, M12 and M28 are associated with invasive GAS disease. Highest mortality is associated with M1 and M3.

Clinical presentation and outcome

GAS causes a wide variety of disease ranging from asymptomatic carriage, uncomplicated skin and pharyngeal infections and scarlet fever, to life-threatening invasive disease. The clinical features of invasive disease depend on the type of illness caused by GAS. Three clinical syndromes are described:

- **Group A streptococcal toxic shock syndrome (STSS)** – infection associated with shock and multi-organ failure
- **Necrotizing fasciitis** – an extensive necrosis of subcutaneous tissue
- **Infections with GAS in a normally sterile site other than STSS or necrotizing fasciitis** - includes bacteraemia, pneumonia, post-operative wound infection and maternal sepsis.

Invasive GAS is an important cause of severe **maternal sepsis**. Maternal sepsis can occur antenatally, however most morbidity and mortality occurs in the postpartum period (when it is known as **puerperal sepsis**). See [Group A Streptococcal Maternal sepsis – information for clinicians](#) for a more detailed description of the clinical presentation of maternal sepsis.

5-30% of the community may carry the organism without it causing disease, usually in the skin or on the throat.¹

Mortality associated with invasive GAS approaches 30% and survivors may be left with chronic sequelae such as infertility.²

Mode of transmission

Invasive GAS is transmitted by droplet spread of respiratory secretions to nasal and respiratory mucous membranes or open wounds, and by direct contact of non-intact skin with exudates from skin infections or respiratory secretions. Additional infection control measures for contact and droplet exposures are required for necrotizing fasciitis and other severe infections.³

Incubation period

The incubation period varies according to the clinical illness. It is usually 1-3 days but can be up to 30 days in some cases.

Infectious period

Cases are infectious from 7 days before the onset of symptoms until 24 hours after initiation of antibiotic treatment.

Persons at increased risk of disease

The elderly, Indigenous Australians, people with chronic diseases (such as diabetes), immunosuppression (such as HIV, chemotherapy, high-dose steroids), and people who inject drugs are all at higher risk of invasive GAS disease.⁴

Surgical, obstetric, and burns patients are particularly vulnerable to infection; broken cutaneous or mucosal barriers may facilitate invasive infection after exposure.

Epidemiology

Over recent decades, a resurgence of invasive GAS has been observed in industrialised countries around the world, including Australia. This has been attributed to the circulation of highly virulent (M types) of group A *Streptococcus*.^{5,6}

Invasive GAS occurs in approximately 3 cases per 100,000 persons in Australia. 85% of gas cases occur sporadically, 10% in hospital patients, 4% in residential care facilities, and 1% in contacts of invasive GAS disease.

2. Response procedure for Public Health Units

Invasive GAS is not a notifiable disease in NSW.

In health care settings the monitoring and response to GAS is the responsibility of infection control practitioners (ICP).

Managers, clinicians or ICPs may seek assistance from the public health unit if outbreaks of infection occur (i.e. two or more related cases), including non health care settings such as residential care. The response to an outbreak should be carried out in collaboration with the cases' health care provider. Treatment of individual cases is the responsibility of the treating doctor.

Invasive GAS in health care settings may be highly transmissible and may be associated with fatal outcomes.^{1,7} Two or more cases of invasive GAS disease in hospitalised or recently discharged patients requires further investigation. Surgical, obstetric and burns units are most commonly involved, although outbreaks have occurred in a wide range of hospital settings.⁷

If two or more hospital acquired invasive GAS infections (of the same strain) are identified then further public health investigation, including possible HCW screening, is recommended.^{5,8}

An investigation will be assisted by the formation of an investigation team, with expertise in epidemiological, clinical and laboratory aspects of the outbreak.

The following 10 steps provide a systematic approach to hospital-acquired invasive GAS cluster investigations.

Establish the existence of an outbreak

Defined as 2 or more cases of culture confirmed symptomatic invasive GAS which are linked in time and place.

Investigation should not wait for the results of M typing of the isolate.

A hospital-acquired infection is a GAS infection that is neither present nor incubating at the time of admission. Typically the onset of GAS infection is greater than 48 hours after admission, or postoperatively at any time after admission, and for up to 7 days after discharge from hospital.¹ Infection occurring more than 7 days after discharge is more likely to be community-acquired.

Verify the diagnosis

A diagnosis of invasive GAS requires the identification of GAS from a normally sterile body site (such as blood culture), or the isolation of GAS from a non-sterile site in the presence of clinical features of invasive disease such as maternal sepsis, Streptococcal toxic shock syndrome (STSS), or necrotizing fasciitis.⁷

Confirm the diagnosis with the treating doctor and laboratory. Arrange for typing of specimens by the Centre for Infectious diseases & Microbiology, ICPMR, Westmead.

emm-typing is the molecular gold-standard for typing GAS, further sub-typing may more clearly define linked cases.

Define and identify cases

Develop a case definition, gather information about cases; include name, date, onset, demographics and association with any health care, residential care or other institutional facilities.

Liaise with the laboratory to undertake retrospective (up to 6 months prior) and prospective microbiological surveillance of all hospital-acquired GAS infections, and request the laboratory to notify the PHU of any new cases.

Review hospital records for in-patients identified as cases (the ICD10 code for group A streptococcus is B95.0, puerperal sepsis is O85) for further relevant information.

Interview cases about risk factors for illness including:

- history of sore throat or skin infection consistent with GAS or prior to admission
- close contact with someone with an illness that could be attributable to GAS (sore throat, skin lesions)
- co-morbidities e.g. immunosuppression, diabetes
- history of skin damage such as wounds, burns, varicella or skin lesions
- recent or current hospitalisation
- history of surgical procedures, wound dressings, or childbirth
- injecting drug use.

Perform descriptive epidemiology

Describe the case data in terms of time, place, person, and draw an epidemiological curve to display the number of cases by day of onset.

Develop a line-listing of cases, including:

- case identifiers
- age, sex, place of residence
- relevant demographic factors including Aboriginality
- date and onset of symptoms
- date of laboratory confirmed iGAS
- date of admission or discharge from hospital
- ward/location within hospital
- health care worker contacts in common with other cases
- relevant recent exposures, including surgical procedures or child birth.

Determine who is at risk

Consider the source of infection and the usual mode of transmission based on analysis of the data collected. Identify potential facilitators of ongoing infection and barriers to infection control.

Develop hypothesis

Consider the source of illness and the usual mode of transmission based on analysis of the data gathered on the place, time, personal characteristics of the cases, and exposure histories.

Investigation of hospital outbreaks have identified a range of transmission routes; patient-to-patient, environmental sources to patients, colonised or infected health care workers (HCWs) to patients.⁷

Evaluate hypothesis

Consider whether an analytical study will provide useful additional information.

Assess the need for additional studies

If epidemiological investigations of cases indicate a common exposure such as environmental (baths, toilets and showers have been implicated in transmission), HCWs or other patients in common, consider screening of HCWs, patients in common with cases, or environmental sampling.¹

Screening of close community contacts is not usually helpful.

Note: Close community contacts of iGAS should be defined as for close contacts of meningococcal disease.

HCW screening

Invasive GAS outbreaks have been linked to asymptomatic healthcare workers.^{7,9} Of the outbreaks linked to colonised healthcare workers, throat colonisation is most common, although transmission from skin, vaginal and rectal colonisation has occurred.^{1,7}

Those most likely to transmit this infection are those with direct contact with the patient in the 7 days prior to the onset of infection, in particular¹:

- those present in theatre, and performing post-operative dressings for surgical cases
- those performing vaginal examinations or episiotomies, and those present at delivery, for maternity cases
- HCWs with sore throat, skin infection or vaginitis in the week prior to onset in the case.

HCWs should be asked to present for screening if they have had a sore throat, skin infection, or skin lesions, or vaginitis during the week prior to the onset of illness in the case, depending on the results, screening may be broadened to include asymptomatic staff in direct contact with the case.

A step-wise approach to HCW screening may be taken commencing with throat samples and swabs of skin lesions. If swabs are negative but there is a strong epidemiological link, then swabs of vagina, anus and anterior nares may be considered.¹

Implement control measures

Hospital infection control

- Patients with GAS infection should be placed in isolation in a single room. Most cases of GAS infection in hospital settings should be isolated for a minimum of 24 hours of antibiotic therapy.¹
- Reinforce standard infection control procedures including hand washing, HCWs to cover any open skin lesions, use suitable personal protective equipment (PPE), including disposable gloves and aprons when in contact with the patient or their equipment and immediate surroundings.
- Additional protective measures such as masks are required for procedures where droplet spread may occur, eg bronchoscopy, or dressing changes with a large amount of exudate.
- Baths and showers in post-natal and delivery suites have been implicated in transmission of GAS and should be cleaned/decontaminated between each patient use.¹
- Linen and waste should be considered hazardous while the patient is infectious.
- There is no evidence to support the use of antiseptic baths.

HCW treatment

The treatment regime should be based on advice from an Infectious Diseases specialist.

Exclusion period: asymptomatic HCWs may return to work 24 hours after antibiotic treatment begins; if symptomatic they may be excluded until 24 hours after treatment initiation and resolution of symptoms.¹

Follow up: follow-up cultures can be taken 7-10 days after completion of treatment to ensure eradication has been achieved.⁸ Screening of HCW close contacts will be required if recolonisation occurs .

Other contact management

There is limited evidence to support the use of chemoprophylaxis in close contacts of people with invasive GAS. The risk of invasive GAS in household contacts is higher than in the general public, however, subsequent invasive GAS infections in household contacts are rare.^{8, 10} Risk estimates for household settings suggest that over 2000 close contacts would need chemoprophylaxis to prevent one single case of infection.¹⁰

Close contacts should receive information about GAS, (available from: <http://www.health.nsw.gov.au/publichealth/Infectious/factsheets.asp>) and have a heightened awareness of the signs and symptoms of GAS for 30 days after the diagnosis of invasive GAS in the index patient. They should be advised to seek medical advice if they develop symptoms.¹⁰

Chemoprophylaxis following an outbreak may be considered in the following situations¹⁰:

- a household with 2 or more diagnoses of iGAS
- close contacts of a HCW with persistent carriage
- close contacts with increased susceptibility to severe infection, such as residents in an aged care facility, injecting drug users, and child care centres
- close contacts with symptoms suggestive of localized GAS infection such as sore throat, fever, skin infection

Guidelines for antibiotics to be used for chemoprophylaxis vary across the globe; expert advice should be sought from appropriate clinicians such as Infectious Diseases specialists.

Communicate findings

Document findings to convey recommendations about the immediate control of invasive GAS outbreaks, and to provide evidence for policies designed to prevent future outbreaks. Communicate findings back to those affected by the outbreak.

3. References

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